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WHAT IS TO BE EXPECTED FROM THE OPEN-AIR  
TREATMENT OF PULMONARY TUBERCULOSIS?

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Royal Infirmary, Edinburgh.*

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IN a paper published last year, "On the Universal Applicability of the Open-air Treatment of Pulmonary Tuberculosis,"\* I ventured to advance the proposition that "if the patient can only be persuaded to be out of doors, lying, sitting, or walking, as the case may be, a large part of each day, and, when indoors, to allow the freest access of fresh air day and night, results may be obtained in almost any district which will compare satisfactorily with those obtainable at most favoured resorts." The view was based on continuous observation during a good many years in various directions, and especially in the conduct of the Victoria Hospital for Consumption, which was established and has been maintained throughout on the open-air principle strictly.

From the tenor of a number of communications which have been published, or have reached me in other ways, there appears to exist considerable misgiving as to the position. Doubt has been expressed as to the correctness and even as to the seriousness of the statement. Thus one writer † discussing the view with considerable vehemence remarks, "there are but few days in the winter and early spring in England when a patient with tuberculous lung disease could lie out of doors all day, or walk about . . . . One day spent out of doors, followed by two or three in the house because of mist, fog, wind or rain, or cold without sun, would more than undo any good which had been obtained, and that seems to be the best which can be hoped for."

\* *Brit. Med. Journal*, 23rd July, 1898.

† *Lancet*, 26th November, 1898.

Tradition and prejudice die hardly. Throughout the winter, I have been frequently met with the question, "What about your open-air treatment?"—as if it were a matter of season or fashion. The question has been apposite, because of the cold, inclement character of the late winter and spring. The answer to the question remains the same. Hardly a single case has passed through our hands without remarkable benefit, a benefit of which the limits are apparently only governed by the possibility of the patient's maintaining for a sufficient length of time the physiological conditions which lead to cure. It is the object of the present paper to afford fresh illustration and proof of the position which I previously maintained.

Before passing to the question immediately on hand, I am desirous that it should be clearly understood that the establishment of the universal applicability of the open-air treatment is in no sense opposed to the view that for individual cases advantage may sometimes be offered by selected climates. Many considerations will continue to influence the choice of residence for particular patients. This admission does not detract from the extreme significance of the proposition that Great Britain, and every district in the United Kingdom for itself, can, as every other country can, undertake successfully the treatment of pulmonary tuberculosis, just as they can and must undertake its prevention.

Two aspects of the question occur to me as especially deserving consideration. The first is, Can consumptive patients be exposed with safety to the open-air treatment during winter and spring in this country, and, if so, what proportion of time can with advantage be thus spent? The second is, What results may be attributed to the treatment?

I. *Can consumptive patients be exposed with safety to the open-air treatment during winter and spring in this country, and, if so, to what extent?*—By way of answer, I submit a table showing the daily periods (in hours) during which strictly open-air life, *i.e.* life in the open, was enjoyed by *each* of the patients in residence in the Victoria Hospital for Consumption from 1st February to 30th April of this year. I have selected those three months without reference to the patients in residence, because they form commonly the most trying quarter in the

whole year in this district. So far as the patients are concerned, no exception has been made. As it happens, the list includes cases of considerable gravity with high temperatures, during part of the time, and laryngeal and intestinal complications. Opposite each date is recorded the number of hours of sunshine, kindly communicated to me by Dr. Alexander Buchan.

It is evident from the appended table that consumptive patients can be out of doors during the larger portion of daylight, even when actual sunshine is small in amount. There was not a single day throughout the quarter—as there has not been a single day throughout the years during which I have conducted such observations—on which the patients were not outside for a considerable period. On many days when the comfortable, robust citizen preferred “to warm himself before a good roaring fire,” my patients were reclining or walking out of doors with satisfactory results which we shall detail immediately. The table illustrates a further remarkable point, namely, how rapidly the patient can be introduced to the altered conditions of life.

If for any reason, such as the presence of intestinal complication with diarrhoea, the patient can be treated less conveniently outside, the bed is drawn close to the widely opened window, so that the patient lies as nearly as possible outside. I should add that, in addition to the strictly out-of-door life, the fresh air treatment is maintained indoors day and night by means of most freely opened windows. We have no draughts, because of the abundance of fresh air. For the same reason there is no hospital or even indoor odour throughout the house.

II. There can be, therefore, no manner of doubt as to the feasibility of keeping consumptive patients on the open-air system throughout the whole—even the least element periods—of our much maligned meteorological year. It remains to be asked, *What results may be attributed to the treatment?*

In the forefront, I desire to emphasise most strongly that the treatment has, in my experience, never resulted in untoward consequences to the slightest degree. Throughout a good many years I have not been able to trace a single accident or disadvantage in any one case. This incontestable statement appears to me of the utmost significance, having regard to the variety of accident to which the tuberculous patient is liable. I confess

it has produced in my mind the uncomfortable feeling that many of the accidents which do occur in the course of the disease are the outcome of self-imposed conditions, which are the expression of unreasoning traditionalism in the care of the sick, on the part both of doctor and patient.

But the negative statement, although of enormous significance, is far from exhausting the subject. The system produces positive results of most satisfactory and far-reaching character. In the first place, I wish to combat the *a priori* objection that the method is bound to make the individual uncomfortable and wretched. Far from this, my experience is that within a very short time, patients recover a degree of cheerfulness and sense of well-being to which they have been long time strangers. In a week's time, their outlook, no less than their aspect, changes for the better to an extraordinary degree. With the change there quickly disappears an irritability which pervaded every organ and tissue. The rapidity with which the organism adapts itself to the improved physiological conditions is a most noteworthy feature, and a significant testimony in favour of the procedure. This is the more remarkable in relation to the class of patients treated in the Victoria Hospital, which admits patients on the gratuitous basis only, *i.e.* patients chiefly of the more ignorant and prejudiced classes, whose manner of life hitherto has been commonly in strong contrast to the open-air system.

It may be both interesting and serviceable to note some of the chief indications of improvement in greater detail.

(a) *Colour and appearance*.—Within a week of the adoption of the open-air system, the colour and general appearance have altered. The extent of this is often marvellous. The look of delicacy is quickly replaced by an aspect of robustness, such as one is accustomed to recognise developing on shipboard. This is so conspicuous that in going round the patients one may readily fix, with approximate exactness, the length of residence by the outward appearance. Similarly, it is a common experience to have visitors—both professional and lay—remark that there can be little wrong with this or that patient, in whom the physical signs belie the suggestion. This is the more striking, because the majority of the patients have been for considerable periods prior to admission under treatment



1.—TABLE showing Daily Periods in Hours during which Open-air Treatment was enjoyed *Outside* by each Patient in the Victoria Hospital for Consumption, Edinburgh, from February 1st to April 30th, 1899. The first horizontal line indicates by numeral the individual patient. As the Hospital has accommodation for 15 patients only, the observations commence and terminate at different dates. Date of admission is indicated by "A," discharge by "D."

Date.	Hours of Sunshine.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
Feb.																																							
1	3.23	6½	6½	5	6½	6½	6½	6½	4½	5	4½	6	5	6	5½																								
2	3.70	2½	6½	6½	6	7	6	5½	4	5	6	3½	5	5																									
3	—	3	6½	6	6	6	6	6	2½	5	5½	6	6	6	6																								
4	—	—	6	6	6	6	6	6	4	5	5½	6	6	6	6																								
5	—	—	5	6	6	6	6	6	3	—	—	4	5	5	6																								
6	—	—	6	6	6	6	6	6	5	—	—	5	5	5	6																								
7	.48	3	6½	5	5½	6	6	6	5	2	3½	6	5	5	6																								
8	.63	3½	6½	6	6	6	6	6	5	3	5	6	4½	4½	6																								
9	.22	3½	6½	6	6	6	6	6	5	3	5	6	5	5	6																								
10	.42	3½	6½	7	6	6	6	6	5½	5	6	6	6	6	6																								
11	3.20	4	6½	7	6	6	6	6	5	1	6	6	6	6	6																								
12	—	4½	6½	7	6	6	6	6	5	4	6	6	6	6	6																								
13	.08	4½	6½	6	6	6	6	6	4½	5	6	6	6	6	6																								
14	3.23	5	5½	6	6	6	6	6	4	5	5½	6	6	6	6																								
15	6.07	5½	6½	6	6	6	6	6	5	5	6	6	6	6	6																								
16	—	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
17	4.67	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
18	—	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
19	—	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
20	4.96	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
21	3.45	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
22	2.00	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
23	1.50	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
24	5.20	5	6	6	6	6	6	6	5	5	6	6	6	6	6																								
25	7.00	5	6	6	6	6	6	6	5	5	6	6	6	6	6																								
26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—																								
27	4.47	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
28	1.47	5½	6½	7	6	6	6	6	4	5	6	6	6	6	6																								
March																																							
1	2.55	6	6	6	6	6	6	6	5½	5½	6	6	6	6	6																								
2	—	6	6	6	6	6	6	6	5	—	—	4	5	5	6																								
3	3.95	5½	6	6	6	6	6	6	5	5	6	6	6	6	6																								
4	—	6	6	6	6	6	6	6	5	—	—	4	5	5	6																								
5	.15	5	6	6	6	6	6	6	5	5	6	6	6	6	6																								
6	3.10	5½	6	6	6	6	6	6	5	5	6	6	6	6	6																								
7	7.35	5½	6	6	6	6	6	6	5	5	6	6	6	6	6																								
8	.38	6	6	6	6	6	6	6	5	—	—	4	5	5	6																								
9	—	6	6	6	6	6	6	6	5	—	—	4	5	5	6																								
10	.15	5½	6	6	6	6	6	6	5	—	—	4	5	5	6																								
11	.10	6	6	6	6	6	6	6	5	—	—	4	5	5	6																								
12	7.82	6	6	6	6	6	6	6	5	—	—	4	5	5	6																								
13	.65	6	6	6	6	6	6	6	5	—	—	4	5	5	6																								
14	1.36	6	6	6	6	6	6	6	5	—	—	4	5	5	6																								

In bed alongside widely open window all day.

In bed alongside widely open window all day.

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16	7 $\frac{1}{2}$	7 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
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19	7 $\frac{1}{2}$	7 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
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16	5 $\frac{1}{2}$	5 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
17	5 $\frac{1}{2}$	5 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
18	5 $\frac{1}{2}$	5 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
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22	5 $\frac{1}{2}$	5 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
23	5 $\frac{1}{2}$	5 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
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25	5 $\frac{1}{2}$	5 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
26	5 $\frac{1}{2}$	5 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	6	8																			
27	5 $\frac{1}{2}$	5 $\frac{1}{2}$				4	4 $\frac{1}{2}$	5 $\frac{1}{2}$				5 $\frac{1}{2}$	7 $\frac{1}{2}$																								

for tuberculosis, either in hospital or privately. In other words, much of the familiar appearance of the consumptive patient is the expression of the unphysiological, protective treatment, which is more generally adopted.

(b) *Appetite and digestion*.—Much has been written about the value of forced feeding. But there is good reason to doubt, if the case is correctly stated when it is so put. Little good—and often much inconvenience—follows the adoption of forced feeding under the ordinary protective system. On the other hand, bathed in fresh air, the patient speedily drops his digestive disability. There is no longer complaint of nausea, sickness, sense of oppression or pain. Appetite returns in astounding fashion, and even a craving for food not easily satisfied. The quantity of food may now be increased without risk of digestive discomfort. There is commonly no question of compulsion—or even coaxing—so that the term, “forced feeding” is inapplicable and misleading. Milk and fats of various kinds, which previously produced loathing disinclination, are taken freely and even greedily. Constipation too, which is the common habit of bowel, in the absence of intestinal irritation or disease, tends likewise to disappear.

(c) *Weight*.—The rapidity with which flesh is put on is phenomenal. We have recorded gain in weight frequently to the extent of 2 to 6 lb. in a week’s time; and commonly the gain is steadily progressive through the entire period of residence. The criticism which may be offered, that such gain is a common enough experience in hospitals in relation to the better conditions of feeding under which the patient is placed, is only partially valid. This rapid and continuous increase of weight has been recorded frequently in consumptive patients who have been transferred from the Royal Infirmary or other hospital where the dietary is of the first order, but where open-air treatment in the proper sense is not attainable. The leading cause of the gain in weight is the largely increased power of assimilation, which is rendered possible by the improvement in appetite and primary digestion.

(d) *Cough*.—This is one of the commonly described symptoms of pulmonary tuberculosis, and yet it need hardly be present. Cough may be interpreted as, in large part, the prayer—or perhaps I should say, the groan—of the lungs for more air. I



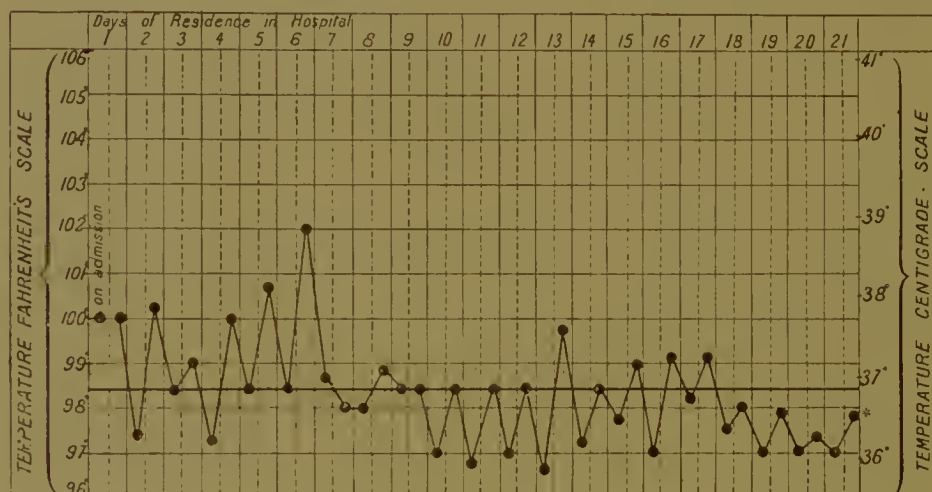
have ventured to put it thus, because, given an unlimited supply, cough is seldom heard. Cough is also at times merely a bad habit. We often notice that new-comers are apt to cough by night or day, to the annoyance of *habitués*, who are frequently loudest in the assurance that the cough is unnecessary. Apart from occasional cough for the purpose of expectoration, the sound need not be heard. Visitors to the hospital commonly remark on its absence. The cough which occurs so frequently when the disease is treated in snug, confined bedrooms is in large part the expression of irritation by reason of exhausted or fouled air.

(e) *Expectoration*.—Sputum lessens speedily in amount. It becomes more and more mucous, until finally it may disappear. Hæmoptysis is almost unknown. No serious hæmoptysis has occurred in the hospital since the commencement.

(f) *Night sweats*.—These are generally regarded as so classic a feature of consumption that it may seem a piece of vandalism to put them in another light. Nevertheless, experience has convinced me that, for the most part, night sweating is an avoidable occurrence—an expression of culpability on the part of physician or nurse. Under the open-air treatment such sweating is as infrequent as previously it was supposed to be common. On admission, patients often sweat and for some days thereafter, but they cease to do so quickly. Patients have been received who previously, in private or in other hospitals, required to be changed four or five times during the night, with corresponding disturbance and prejudice of strength, and in whom, after three or four days' treatment, the manifestation disappeared entirely. It has not been found advisable to use special drugs.

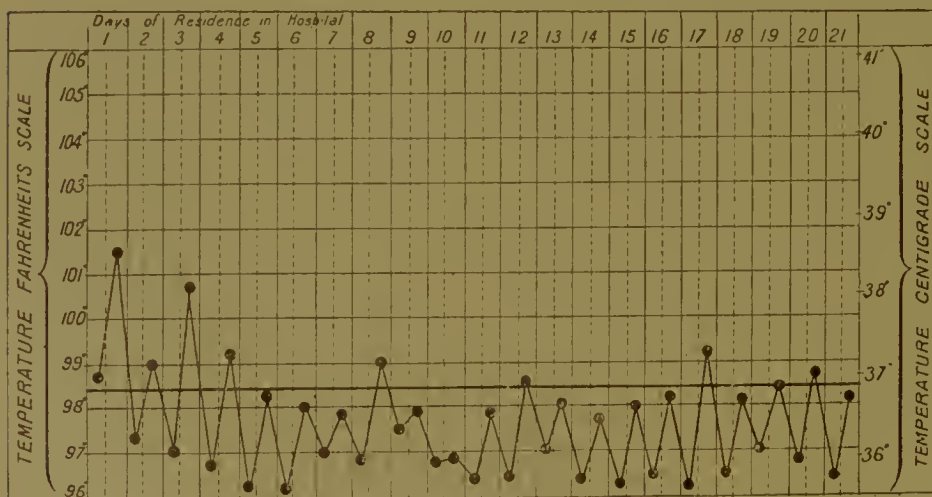
(g) *Circulation*.—The open-air system effects a most striking change in the circulation. The pulse rate soon lessens. Correspondingly each beat becomes more forcible, and the blood-pressure within the vessels is raised. Thus, within the first ten days it is no uncommon thing to note a reduction in rate to the extent of 20 to 30 beats per minute. Coincidentally coldness of extremities, which may have been most distressing, disappears, and similarly the tendency to shiver and feel "creepy," which is frequent in consumptive patients under the protective system of treatment.

(h) *Temperature.*—The changes effected in relation to body temperature are most conspicuous. Commonly, within a week or two, temperatures which previously swung violently have reached or approximated the normal. The accompanying charts (2, 3 and 4) illustrate the points.\* Similar charts are of frequent occurrence.



2.—Temperature Chart showing alteration from swinging pyrexial elevation to approximately normal within ten days after admission. (N.B.—For weeks prior to admission the patient's temperature was reported as swinging between 97° and 102° F. During residence no febrifuge was administered.)

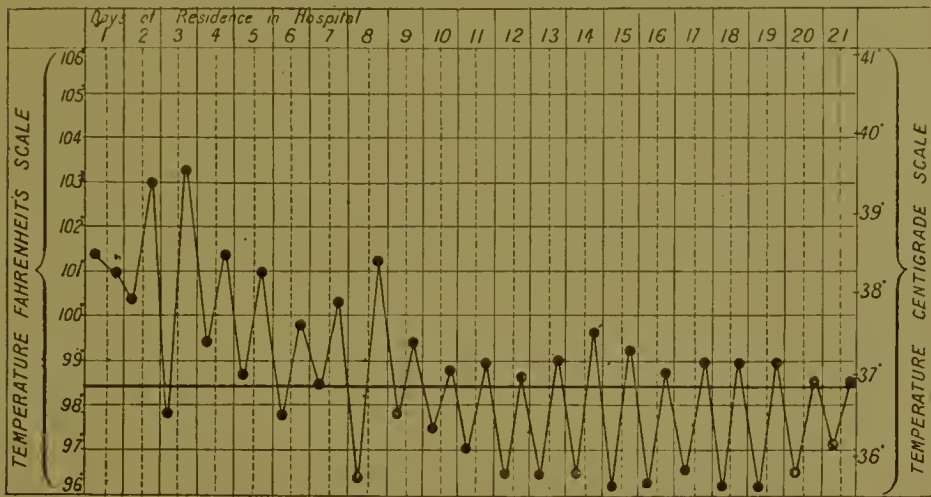
\* And thereafter never above normal line during residence.



3.—Temperature Chart showing similar return to approximately normal. The patient's temperature had swung still more violently before admission.

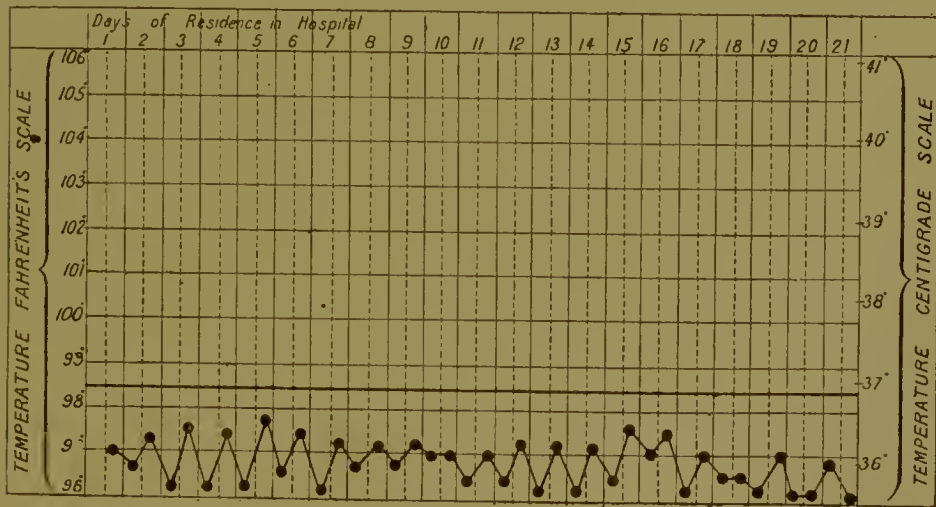
\* In all three instances, the patients had marked bilateral involvement, with abundant evidence of progressive disintegrative change and vomica formation.

In fact, pyrexial elevations are seldom recorded in patients who have been more than ten days or a fortnight in residence,



4.—Temperature Chart showing similar return to approximately normal. The patient's temperature had swung violently for many weeks previous to admission.

save in presence of intestinal or other such complication, or of acute dissemination of tubercle throughout the lungs or more widely. The most frequent type of temperature chart occurring in patients after residence for some weeks is illustrated in Fig. 5.



5.—Temperature Chart, showing subnormal curve frequently observed in cases of pulmonary tuberculosis which are proceeding favourably to cicatrization and cure, even while physical evidence of moisture, etc., is abundantly present.

This is not the expression of a quiescent condition, or of a chronic variety merely. It is established speedily under the

conditions of open-air treatment in patients who previously have afforded violently oscillating readings, and in whom, while the temperature is thus constant, evidence of moisture and other physical signs of more active disease continue present. So marked is this, that I am inclined to regard the mean temperature of the tuberculous patient whose lung is proceeding favourably towards cicatrisation and cure as a slightly sub-normal one. I have excluded fallacy in respect of the record by taking the temperature in a certain number of test instances every hour by day, and every two or three hours by night, without essential modification of the curve.

This is not the place to discuss the significance of temperature in tuberculosis and in mixed infections. But extended observations of temperature readings under different systems of treatment have convinced me that there is much of fallacy lurking in the attempt which is frequently made to stereotype varieties of pulmonary tuberculosis according to the temperature charts. Nevertheless, the state of the temperature affords explicit indication of improvement or otherwise. From this point of view, the temperature chart is one of the strongest witnesses in favour of the open-air system.